

SEQUENCE LISTING

<110> Glaxo Group Limited

<120> Vaccine

<130> PG4961

<140> PCT/EP2003/011158

<141> 2003-10-01

<150> GB 0222953.2

<151> 2002-10-03

<160> 28

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 1107

<212> DNA

<213> HPV

<400> 1

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<210> 2

<211> 368

<212> PRT

<213> HPV

<400> 2

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Trp Lys Cys Met Arg His Glu Ser Val Leu Leu Tyr Lys Ala Lys Gln

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35

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45

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Ser	Leu	Leu	Arg	Thr	Glu	Tyr	Ser	Met	Glu	Pro	Trp	Thr	Leu	Gln	Glu
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Thr	Ser	Tyr	Glu	Met	Trp	Gln	Thr	Pro	Lys	Arg	Cys	Phe	Ala	Lys	
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Met	Asp	Tyr	Val	Val	Trp	Thr	Asp	Val	Tyr	Val	Gln	Asp	Asn	Asp	Thr
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Trp	Val	Lys	Val	His	Ser	Met	Val	Asp	Ala	Lys	Gly	Ile	Tyr	Tyr	Thr
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Cys	Gly	Gln	Phe	Lys	Thr	Tyr	Tyr	Val	Asn	Phe	Val	Lys	Glu	Ala	Glu
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Lys	Tyr	Gly	Ser	Thr	Lys	His	Trp	Glu	Val	Cys	Tyr	Gly	Ser	Thr	Val
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Ile	Cys	Ser	Pro	Ala	Ser	Val	Ser	Ser	Thr	Thr	Gln	Glu	Val	Ser	Ile
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Pro	Glu	Ser	Thr	Thr	Tyr	Thr	Pro	Ala	Gln	Thr	Ser	Thr	Leu	Val	Ser
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Ser	Ser	Thr	Lys	Glu	Asp	Ala	Val	Gln	Thr	Pro	Pro	Arg	Lys	Arg	Ala
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Arg	Gly	Val	Gln	Gln	Ser	Pro	Cys	Asn	Ala	Leu	Cys	Val	Ala	His	Ile
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			260					265					270		
Gln	His	Gln	Arg	Arg	Asn	Asn	Ser	Asn	Ser	Ser	Ala	Thr	Pro	Ile	Val
		275					280					285			
Gln	Phe	Gln	Gly	Glu	Ser	Asn	Cys	Leu	Lys	Cys	Phe	Arg	Tyr	Arg	Leu
	290					295					300				
Asn	Asp	Arg	His	Arg	His	Leu	Phe	Asp	Leu	Ile	Ser	Ser	Thr	Trp	His
305					310					315					320
Trp	Ala	Ser	Ser	Lys	Ala	Pro	His	Lys	His	Ala	Ile	Val	Thr	Val	Thr
				325					330					335	
Tyr	Asp	Ser	Glu	Glu	Gln	Arg	Gln	Gln	Phe	Leu	Asp	Val	Val	Lys	Ile
			340					345					350		
Pro	Pro	Thr	Ile	Ser	His	Lys	Leu	Gly	Phe	Met	Ser	Leu	His	Leu	Leu
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&lt;210&gt; 3

&lt;211&gt; 1950

&lt;212&gt; DNA

&lt;213&gt; HPV

&lt;400&gt; 3

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aaggttaaac gtcgtctggt ccagactcgt gaactgaccg actccgggta cggttatagc 420
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<210> 4  
<211> 649  
<212> PRT  
<213> HPV

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 35          40          45
Asp Phe Ile Asp Asp Ser Asn Ile Thr His Asn Ser Leu Glu Ala Gln
 50          55          60
Ala Leu Phe Asn Arg Gln Glu Ala Asp Thr His Tyr Ala Thr Val Gln
 65          70          75          80
Asp Leu Gly Gly Lys Tyr Leu Gly Ser Pro Tyr Val Ser Pro Ile Asn
 85          90          95
Thr Ile Ala Glu Ala Val Glu Ser Glu Ile Ser Pro Arg Leu Asp Ala
100          105          110
Ile Lys Leu Thr Arg Gln Pro Lys Lys Val Lys Arg Arg Leu Phe Gln
115          120          125
Thr Arg Glu Leu Thr Asp Ser Gly Tyr Gly Tyr Ser Glu Val Glu Ala
130          135          140
Gly Thr Gly Thr Gln Val Glu Lys His Gly Val Pro Glu Asn Gly Gly
145          150          155          160
Asp Gly Gln Glu Lys Asp Thr Gly Arg Asp Ile Glu Gly Glu Glu His
165          170          175
Thr Glu Ala Glu Ala Pro Thr Asn Ser Val Arg Glu His Ala Gly Thr
180          185          190
Ala Gly Ile Leu Glu Leu Leu Lys Cys Lys Asp Leu Arg Ala Ala Leu
195          200          205
Leu Gly Lys Phe Lys Glu Cys Phe Gly Leu Ser Phe Ile Asp Leu Ile
210          215          220

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				245					250					255	
Glu	Pro	Leu	Ser	Leu	Tyr	Ala	His	Ile	Gln	Trp	Leu	Thr	Asn	Ala	Trp
			260					265					270		
Gly	Met	Val	Leu	Leu	Val	Leu	Leu	Arg	Phe	Lys	Val	Asn	Lys	Ser	Arg
	275						280					285			
Ser	Thr	Val	Ala	Arg	Thr	Leu	Ala	Thr	Leu	Leu	Asn	Ile	Pro	Glu	Asn
	290					295					300				
Gln	Met	Leu	Ile	Glu	Pro	Pro	Lys	Ile	Gln	Ser	Gly	Val	Ala	Ala	Leu
305					310					315					320
Tyr	Trp	Phe	Arg	Thr	Gly	Ile	Ser	Asn	Ala	Ser	Thr	Val	Ile	Gly	Glu
				325					330					335	
Ala	Pro	Glu	Trp	Ile	Thr	Arg	Gln	Thr	Val	Ile	Glu	His	Gly	Leu	Ala
			340					345					350		
Asp	Ser	Gln	Phe	Lys	Leu	Thr	Glu	Met	Val	Gln	Trp	Ala	Tyr	Asp	Asn
	355						360					365			
Asp	Ile	Cys	Glu	Glu	Ser	Glu	Ile	Ala	Phe	Glu	Tyr	Ala	Gln	Arg	Gly
	370					375					380				
Asp	Phe	Asp	Ser	Asn	Ala	Arg	Ala	Phe	Leu	Asn	Ser	Asn	Met	Gln	Ala
385					390					395					400
Lys	Tyr	Val	Lys	Asp	Cys	Ala	Thr	Met	Cys	Arg	His	Tyr	Lys	His	Ala
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Glu	Met	Arg	Lys	Met	Ser	Ile	Lys	Gln	Trp	Ile	Lys	His	Arg	Gly	Ser
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Leu	His	Gly	Thr	Pro	Lys	Lys	Asn	Cys	Ile	Ala	Ile	Val	Gly	Pro	Pro
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Pro	Leu	Val	Asp	Ala	Lys	Val	Ala	Leu	Leu	Asp	Asp	Ala	Thr	Gln	Pro
	515						520					525			
Cys	Trp	Ile	Tyr	Met	Asp	Thr	Tyr	Met	Arg	Asn	Leu	Leu	Asp	Gly	Asn
	530					535					540				
Pro	Met	Ser	Ile	Asp	Arg	Lys	His	Lys	Ala	Leu	Thr	Leu	Ile	Lys	Cys
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Pro	Pro	Leu	Leu	Val	Thr	Ser	Asn	Ile	Asp	Ile	Thr	Lys	Glu	Asp	Lys
				565					570					575	
Tyr	Lys	Tyr	Leu	His	Thr	Arg	Val	Thr	Thr	Phe	Thr	Phe	Pro	Asn	Pro
			580					585					590		
Phe	Pro	Phe	Asp	Arg	Asn	Gly	Asn	Ala	Val	Tyr	Glu	Leu	Ser	Asn	Thr
		595					600				605				
Asn	Trp	Lys	Cys	Phe	Phe	Glu	Arg	Leu	Ser	Ser	Ser	Leu	Asp	Ile	Gln
	610					615					620				
Asp	Ser	Glu	Asp	Glu	Glu	Asp	Gly	Ser	Asn	Ser	Gln	Ala	Phe	Arg	Cys
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<210> 5  
 <211> 1104  
 <212> DNA

<213> hpv

<400> 5

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<210> 6

<211> 367

<212> PRT

<213> HPV

<400> 6

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Trp Lys Cys Ile Arg Leu Glu Ser Val Leu Leu His Lys Ala Lys Gln
 35          40          45
Met Gly Leu Ser His Ile Gly Leu Gln Val Val Pro Pro Leu Thr Val
 50          55          60
Ser Glu Thr Lys Gly His Asn Ala Ile Glu Met Met Gln Met His Leu Glu
 65          70          75          80
Ser Leu Ala Lys Thr Gln Tyr Gly Val Glu Pro Trp Thr Leu Gln Asp
 85          90          95
Thr Ser Tyr Glu Met Trp Leu Thr Pro Pro Lys Arg Cys Phe Ala Lys
100          105          110
Gln Gly Asn Thr Val Glu Val Lys Phe Asp Gly Cys Glu Asp Asn Val
115          120          125
Met Glu Tyr Val Val Trp Thr His Ile Tyr Leu Gln Asp Asn Asp Ser
130          135          140
Trp Val Lys Val Thr Ser Ser Val Asp Ala Lys Gly Ile Tyr Tyr Thr
145          150          155          160
Cys Gly Gln Phe Lys Thr Tyr Tyr Val Asn Phe Asn Lys Glu Ala Gln
165          170          175

Lys Tyr Gly Ser Thr Asn His Trp Glu Val Cys Tyr Gly Ser Thr Val
180          185          190
Ile Cys Ser Pro Ala Ser Val Ser Ser Thr Val Arg Glu Val Ser Ile
195          200          205
Ala Glu Pro Thr Thr Tyr Thr Pro Ala Gln Thr Thr Ala Pro Thr Val
210          215          220
Ser Ala Cys Thr Thr Glu Asp Gly Val Ser Ala Pro Pro Arg Lys Arg
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225					230					235				240
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Ser	Val	Asp	Ser	Thr	Ile	Asn	Asn	Ile	Val	Thr	Asp	Asn	Tyr	Asn
			260					265					270	
His	Gln	Arg	Arg	Asn	Asn	Cys	His	Ser	Ala	Ala	Thr	Pro	Ile	Val
		275					280				285			
Leu	Gln	Gly	Asp	Ser	Asn	Cys	Leu	Lys	Cys	Phe	Arg	Tyr	Arg	Leu
	290					295					300			
Asp	Lys	Tyr	Lys	His	Leu	Phe	Glu	Leu	Ala	Ser	Ser	Thr	Trp	His
305					310					315				320
Ala	Ser	Pro	Glu	Ala	Pro	His	Lys	Asn	Ala	Ile	Val	Thr	Leu	Thr
				325					330					335
Ser	Ser	Glu	Glu	Gln	Arg	Gln	Gln	Phe	Leu	Asn	Ser	Val	Lys	Ile
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<210> 7  
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 <212> DNA  
 <213> HPV

<400> 7

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<210> 8  
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 <212> PRT  
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<400> 8

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		20						25					30		
Trp	Lys	Cys	Ile	Arg	Leu	Glu	Ser	Val	Leu	Leu	His	Lys	Ala	Lys	Gln
		35					40				45				
Met	Gly	Leu	Ser	His	Ile	Gly	Leu	Gln	Val	Val	Pro	Pro	Leu	Thr	Val
50						55					60				

Ser	Glu	Thr	Lys	Gly	His	Asn	Ala	Ile	Glu	Met	Gln	Met	His	Leu	Glu
65					70					75					80
Ser	Leu	Ala	Lys	Thr	Gln	Tyr	Gly	Val	Glu	Pro	Trp	Thr	Leu	Gln	Asp
			85						90					95	
Thr	Ser	Tyr	Glu	Met	Trp	Leu	Thr	Pro	Pro	Lys	Arg	Cys	Phe	Ala	Lys
			100					105					110		
Gln	Gly	Asn	Thr	Val	Glu	Val	Lys	Phe	Asp	Gly	Cys	Glu	Asp	Asn	Val
		115					120					125			
Met	Glu	Tyr	Val	Val	Trp	Thr	His	Ile	Tyr	Leu	Gln	Asp	Asn	Asp	Ser
	130					135					140				
Trp	Val	Lys	Val	Thr	Ser	Ser	Val	Asp	Ala	Lys	Gly	Ile	Tyr	Tyr	Thr
145					150					155					160
Cys	Gly	Gln	Phe	Lys	Thr	Tyr	Tyr	Val	Asn	Phe	Asn	Lys	Glu	Ala	Gln
				165					170					175	
Lys	Tyr	Gly	Ser	Thr	Asn	His	Trp	Glu	Val	Cys	Tyr	Gly	Ser	Thr	Val
			180					185					190		
Ile	Cys	Ser	Pro	Ala	Ser	Val	Ser	Ser	Thr	Val	Arg	Glu	Val	Ser	Ile
	195						200					205			
Ala	Glu	Pro	Thr	Thr	Tyr	Thr	Pro	Ala	Gln	Thr	Thr	Ala	Pro	Thr	Val
	210					215					220				
Ser	Ala	Cys	Thr	Thr	Glu	Asp	Gly	Val	Ser	Ala	Pro	Pro	Arg	Lys	Arg
225					230					235					240
Ala	Arg	Gly	Pro	Ser	Thr	Asn	Asn	Thr	Leu	Cys	Val	Ala	Asn	Ile	Arg
				245					250					255	
Ser	Val	Asp	Ser	Thr	Ile	Asn	Asn	Ile	Val	Thr	Asp	Asn	Tyr	Asn	Lys
			260					265					270		
His	Gln	Arg	Arg	Asn	Asn	Cys	His	Ser	Ala	Ala	Thr	Pro	Ile	Val	Gln
	275						280					285			
Leu	Gln	Gly	Asp	Ser	Asn	Cys	Leu	Lys	Cys	Phe	Arg	Tyr	Arg	Leu	Asn
	290					295					300				
Asp	Lys	Tyr	Lys	His	Leu	Phe	Glu	Leu	Ala	Ser	Ser	Thr	Trp	His	Trp
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Ala	Ser	Pro	Glu	Ala	Pro	His	Lys	Asn	Ala	Ile	Val	Thr	Leu	Thr	Tyr
				325					330					335	
Ser	Ser	Glu	Glu	Gln	Arg	Gln	Gln	Phe	Leu	Asn	Ser	Val	Lys	Ile	Pro
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<211> 2206

<212> DNA

<213> HPV

<400> 9

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acgctcgtca	gcagcagcac	caaggaggac	gccgtccaga	cgcccccccg	gaagagggcc	720
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<211> 735  
<212> PRT  
<213> HPV

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Trp Lys Cys Met Arg His Glu Ser Val Leu Leu Tyr Lys Ala Lys Gln
 35          40          45
Met Gly Leu Ser His Ile Gly Met Gln Val Val Pro Pro Leu Lys Val
 50          55          60
Ser Glu Ala Lys Gly His Asn Ala Ile Glu Met Gln Met His Leu Glu
 65          70          75          80
Ser Leu Leu Arg Thr Glu Tyr Ser Met Glu Pro Trp Thr Leu Gln Glu
 85          90          95
Thr Ser Tyr Glu Met Trp Gln Thr Pro Pro Lys Arg Cys Phe Ala Lys
100          105          110
Arg Gly Lys Thr Val Glu Val Lys Phe Asp Gly Cys Ala Asn Asn Thr
115          120          125
Met Asp Tyr Val Val Trp Thr Asp Val Tyr Val Gln Asp Asn Asp Thr
130          135          140
Trp Val Lys Val His Ser Met Val Asp Ala Lys Gly Ile Tyr Tyr Thr
145          150          155          160
Cys Gly Gln Phe Lys Thr Tyr Tyr Val Asn Phe Val Lys Glu Ala Glu
165          170          175
Lys Tyr Gly Ser Thr Lys His Trp Glu Val Cys Tyr Gly Ser Thr Val
180          185          190
Ile Cys Ser Pro Ala Ser Val Ser Ser Thr Thr Gln Glu Val Ser Ile
195          200          205
Pro Glu Ser Thr Thr Tyr Thr Pro Ala Gln Thr Ser Thr Leu Val Ser
210          215          220

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Ser	Ser	Thr	Lys	Glu	Asp	Ala	Val	Gln	Thr	Pro	Pro	Arg	Lys	Arg	Ala
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Arg	Gly	Val	Gln	Gln	Ser	Pro	Cys	Asn	Ala	Leu	Cys	Val	Ala	His	Ile
				245					250					255	
Gly	Pro	Val	Asp	Ser	Gly	Asn	His	Asn	Leu	Ile	Thr	Asn	Asn	His	Asp
			260					265					270		
Gln	His	Gln	Arg	Arg	Asn	Asn	Ser	Asn	Ser	Ser	Ala	Thr	Pro	Ile	Val
		275					280					285			
Gln	Phe	Gln	Gly	Glu	Ser	Asn	Cys	Leu	Lys	Cys	Phe	Arg	Tyr	Arg	Leu
	290					295				300					
Asn	Asp	Arg	His	Arg	His	Leu	Phe	Asp	Leu	Ile	Ser	Ser	Thr	Trp	His
305					310					315					320
Trp	Ala	Ser	Ser	Lys	Ala	Pro	His	Lys	His	Ala	Ile	Val	Thr	Val	Thr
				325					330					335	
Tyr	Asp	Ser	Glu	Glu	Gln	Arg	Gln	Gln	Phe	Leu	Asp	Val	Val	Lys	Ile
			340					345					350		
Pro	Pro	Thr	Ile	Ser	His	Lys	Leu	Gly	Phe	Met	Ser	Leu	His	Leu	Leu
		355					360					365			
Met	Glu	Ala	Ile	Ala	Lys	Arg	Leu	Asp	Ala	Cys	Gln	Asp	Gln	Leu	Leu
	370					375				380					
Glu	Leu	Tyr	Glu	Glu	Asn	Ser	Ile	Asp	Ile	His	Lys	His	Ile	Met	His
385					390					395					400
Trp	Lys	Cys	Ile	Arg	Leu	Glu	Ser	Val	Leu	Leu	His	Lys	Ala	Lys	Gln
			405					410						415	
Met	Gly	Leu	Ser	His	Ile	Gly	Leu	Gln	Val	Val	Pro	Pro	Leu	Thr	Val
		420						425					430		
Ser	Glu	Thr	Lys	Gly	His	Asn	Ala	Ile	Glu	Met	Gln	Met	His	Leu	Glu
		435					440					445			
Ser	Leu	Ala	Lys	Thr	Gln	Tyr	Gly	Val	Glu	Pro	Trp	Thr	Leu	Gln	Asp
	450					455					460				
Thr	Ser	Tyr	Glu	Met	Trp	Leu	Thr	Pro	Pro	Lys	Arg	Cys	Phe	Ala	Lys
465					470					475					480
Gln	Gly	Asn	Thr	Val	Glu	Val	Lys	Phe	Asp	Gly	Cys	Glu	Asp	Asn	Val
			485					490						495	
Met	Glu	Tyr	Val	Val	Trp	Thr	His	Ile	Tyr	Leu	Gln	Asp	Asn	Asp	Ser
		500						505					510		
Trp	Val	Lys	Val	Thr	Ser	Ser	Val	Asp	Ala	Lys	Gly	Ile	Tyr	Tyr	Thr
		515					520					525			
Cys	Gly	Gln	Phe	Lys	Thr	Tyr	Tyr	Val	Asn	Phe	Asn	Lys	Glu	Ala	Gln
	530					535					540				
Lys	Tyr	Gly	Ser	Thr	Asn	His	Trp	Glu	Val	Cys	Tyr	Gly	Ser	Thr	Val
545					550					555					560
Ile	Cys	Ser	Pro	Ala	Ser	Val	Ser	Ser	Thr	Val	Arg	Glu	Val	Ser	Ile
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Ala	Glu	Pro	Thr	Thr	Tyr	Thr	Pro	Ala	Gln	Thr	Thr	Ala	Pro	Thr	Val
			580					585					590		
Ser	Ala	Cys	Thr	Thr	Glu	Asp	Gly	Val	Ser	Ala	Pro	Pro	Arg	Lys	Arg
		595					600					605			
Ala	Arg	Gly	Pro	Ser	Thr	Asn	Asn	Thr	Leu	Cys	Val	Ala	Asn	Ile	Arg
	610					615					620				
Ser	Val	Asp	Ser	Thr	Ile	Asn	Asn	Ile	Val	Thr	Asp	Asn	Tyr	Asn	Lys
625					630					635					640
His	Gln	Arg	Arg	Asn	Asn	Cys	His	Ser	Ala	Ala	Thr	Pro	Ile	Val	Gln
			645						650					655	
Leu	Gln	Gly	Asp	Ser	Asn	Cys	Leu	Lys	Cys	Phe	Arg	Tyr	Arg	Leu	Asn
		660						665					670		
Asp	Lys	Tyr	Lys	His	Leu	Phe	Glu	Leu	Ala	Ser	Ser	Thr	Trp	His	Trp
		675					680					685			
Ala	Ser	Pro	Glu	Ala	Pro	His	Lys	Asn	Ala	Ile	Val	Thr	Leu	Thr	Tyr

690						695						700					
Ser	Ser	Glu	Glu	Gln	Arg	Gln	Gln	Phe	Leu	Asn	Ser	Val	Lys	Ile	Pro		
705					710					715					720		
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 <212> DNA  
 <213> HPV

<400> 11

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 <211> 735  
 <212> PRT  
 <213> HPV

<400> 12

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Trp	Lys	Cys	Ile	Arg	Leu	Glu	Ser	Val	Leu	Leu	His	Lys	Ala	Lys	Gln
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Ser	Glu	Thr	Lys	Gly	His	Asn	Ala	Ile	Glu	Met	Gln	Met	His	Leu	Glu
65					70				75						80
Ser	Leu	Ala	Lys	Thr	Gln	Tyr	Gly	Val	Glu	Pro	Trp	Thr	Leu	Gln	Asp
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Thr	Ser	Tyr	Glu	Met	Trp	Leu	Thr	Pro	Pro	Lys	Arg	Cys	Phe	Ala	Lys
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Gln	Gly	Asn	Thr	Val	Glu	Val	Lys	Phe	Asp	Gly	Cys	Glu	Asp	Asn	Val
		115					120					125			
Met	Glu	Tyr	Val	Val	Trp	Thr	His	Ile	Tyr	Leu	Gln	Asp	Asn	Asp	Ser
	130					135					140				
Trp	Val	Lys	Val	Thr	Ser	Ser	Val	Asp	Ala	Lys	Gly	Ile	Tyr	Tyr	Thr
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Cys	Gly	Gln	Phe	Lys	Thr	Tyr	Tyr	Val	Asn	Phe	Asn	Lys	Glu	Ala	Gln
			165						170					175	
Lys	Tyr	Gly	Ser	Thr	Asn	His	Trp	Glu	Val	Cys	Tyr	Gly	Ser	Thr	Val
			180					185					190		
Ile	Cys	Ser	Pro	Ala	Ser	Val	Ser	Ser	Thr	Val	Arg	Glu	Val	Ser	Ile
		195					200					205			
Ala	Glu	Pro	Thr	Thr	Tyr	Thr	Pro	Ala	Gln	Thr	Thr	Ala	Pro	Thr	Val
	210					215					220				
Ser	Ala	Cys	Thr	Thr	Glu	Asp	Gly	Val	Ser	Ala	Pro	Pro	Arg	Lys	Arg
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Ala	Arg	Gly	Pro	Ser	Thr	Asn	Asn	Thr	Leu	Cys	Val	Ala	Asn	Ile	Arg
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Ser	Val	Asp	Ser	Thr	Ile	Asn	Asn	Ile	Val	Thr	Asp	Asn	Tyr	Asn	Lys
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Asp	Lys	Tyr	Lys	His	Leu	Phe	Glu	Leu	Ala	Ser	Ser	Thr	Trp	His	Trp
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Ala	Ser	Pro	Glu	Ala	Pro	His	Lys	Asn	Ala	Ile	Val	Thr	Leu	Thr	Tyr
			325						330					335	
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		340						345					350		
Pro	Thr	Ile	Arg	His	Lys	Val	Gly	Phe	Met	Ser	Leu	His	Leu	Leu	Met
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Glu	Ala	Ile	Ala	Lys	Arg	Leu	Asp	Ala	Cys	Gln	Glu	Gln	Leu	Leu	Glu
	370					375					380				
Leu	Tyr	Glu	Glu	Asn	Ser	Thr	Asp	Leu	His	Lys	His	Val	Leu	His	Trp
385					390					395					400
Lys	Cys	Met	Arg	His	Glu	Ser	Val	Leu	Leu	Tyr	Lys	Ala	Lys	Gln	Met
			405						410					415	
Gly	Leu	Ser	His	Ile	Gly	Met	Gln	Val	Val	Pro	Pro	Leu	Lys	Val	Ser
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Glu	Ala	Lys	Gly	His	Asn	Ala	Ile	Glu	Met	Gln	Met	His	Leu	Glu	Ser
	435					440						445			
Leu	Leu	Arg	Thr	Glu	Tyr	Ser	Met	Glu	Pro	Trp	Thr	Leu	Gln	Glu	Thr
	450					455					460				
Ser	Tyr	Glu	Met	Trp	Gln	Thr	Pro	Pro	Lys	Arg	Cys	Phe	Ala	Lys	Arg
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Gly	Lys	Thr	Val	Glu	Val	Lys	Phe	Asp	Gly	Cys	Ala	Asn	Asn	Thr	Met

										485			490			495			
Asp	Tyr	Val	Val	Trp	Thr	Asp	Val	Tyr	Val	Gln	Asp	Asn	Asp	Thr	Trp				
										500	505			510					
Val	Lys	Val	His	Ser	Met	Val	Asp	Ala	Lys	Gly	Ile	Tyr	Tyr	Thr	Cys				
										515	520			525					
Gly	Gln	Phe	Lys	Thr	Tyr	Tyr	Val	Asn	Phe	Val	Lys	Glu	Ala	Glu	Lys				
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Tyr	Gly	Ser	Thr	Lys	His	Trp	Glu	Val	Cys	Tyr	Gly	Ser	Thr	Val	Ile				
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Cys	Ser	Pro	Ala	Ser	Val	Ser	Ser	Thr	Thr	Gln	Glu	Val	Ser	Ile	Pro				
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Glu	Ser	Thr	Thr	Tyr	Thr	Pro	Ala	Gln	Thr	Ser	Thr	Leu	Val	Ser	Ser				
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Ser	Thr	Lys	Glu	Asp	Ala	Val	Gln	Thr	Pro	Pro	Arg	Lys	Arg	Ala	Arg				
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Gly	Val	Gln	Gln	Ser	Pro	Cys	Asn	Ala	Leu	Cys	Val	Ala	His	Ile	Gly				
										610	615			620					
Pro	Val	Asp	Ser	Gly	Asn	His	Asn	Leu	Ile	Thr	Asn	Asn	His	Asp	Gln				
										625	630			635			640		
His	Gln	Arg	Arg	Asn	Asn	Ser	Asn	Ser	Ser	Ala	Thr	Pro	Ile	Val	Gln				
										645	650			655					
Phe	Gln	Gly	Glu	Ser	Asn	Cys	Leu	Lys	Cys	Phe	Arg	Tyr	Arg	Leu	Asn				
										660	665			670					
Asp	Arg	His	Arg	His	Leu	Phe	Asp	Leu	Ile	Ser	Ser	Thr	Trp	His	Trp				
										675	680			685					
Ala	Ser	Ser	Lys	Ala	Pro	His	Lys	His	Ala	Ile	Val	Thr	Val	Thr	Tyr				
										690	695			700					
Asp	Ser	Glu	Glu	Gln	Arg	Gln	Gln	Phe	Leu	Asp	Val	Val	Lys	Ile	Pro				
										705	710			715			720		
Pro	Thr	Ile	Ser	His	Lys	Leu	Gly	Phe	Met	Ser	Leu	His	Leu	Leu					
										725	730			735					

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 <211> 1950  
 <212> DNA  
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<400> 13

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<210> 14  
 <211> 649  
 <212> PRT  
 <213> HPV

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<400> 14
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Trp Phe Met Val Glu Ala Ile Val Gln His Pro Thr Gly Thr Gln Ile
 20          25          30
Ser Asp Asp Glu Asp Glu Glu Val Glu Asp Ser Gly Tyr Asp Met Val
 35          40          45
Asp Phe Ile Asp Asp Ser Asn Ile Thr His Asn Ser Leu Glu Ala Gln
 50          55          60
Ala Leu Phe Asn Arg Gln Glu Ala Asp Thr His Tyr Ala Thr Val Gln
 65          70          75          80
Asp Leu Gly Gly Lys Tyr Leu Gly Ser Pro Tyr Val Ser Pro Ile Asn
 85          90          95
Thr Ile Ala Glu Ala Val Glu Ser Glu Ile Ser Pro Arg Leu Asp Ala
100          105          110
Ile Lys Leu Thr Arg Gln Pro Lys Lys Val Lys Arg Arg Leu Phe Gln
115          120          125
Thr Arg Glu Leu Thr Asp Ser Gly Tyr Gly Tyr Ser Glu Val Glu Ala
130          135          140
Gly Thr Gly Thr Gln Val Glu Lys His Gly Val Pro Glu Asn Gly Gly
145          150          155          160
Asp Gly Gln Glu Lys Asp Thr Gly Arg Asp Ile Glu Gly Glu Glu His
165          170          175
Thr Glu Ala Glu Ala Pro Thr Asn Ser Val Arg Glu His Ala Gly Thr
180          185          190
Ala Gly Ile Leu Glu Leu Leu Lys Cys Lys Asp Leu Arg Ala Ala Leu
195          200          205
Leu Gly Lys Phe Lys Glu Cys Phe Gly Leu Ser Phe Ile Asp Leu Ile
210          215          220
Arg Pro Phe Lys Ser Asp Lys Thr Thr Cys Leu Asp Trp Val Val Ala
225          230          235          240
Gly Phe Gly Ile His His Ser Ile Ser Glu Ala Phe Gln Lys Leu Ile
245          250          255
Glu Pro Leu Ser Leu Tyr Ala His Ile Gln Trp Leu Thr Asn Ala Trp
260          265          270
Gly Met Val Leu Leu Val Leu Leu Arg Phe Lys Val Asn Lys Ser Arg
275          280          285
Ser Thr Val Ala Arg Thr Leu Ala Thr Leu Leu Asn Ile Pro Glu Asn
290          295          300
Gln Met Leu Ile Glu Pro Pro Lys Ile Gln Ser Gly Val Ala Ala Leu

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305					310					315				320
Tyr	Trp	Phe	Arg	Thr	Gly	Ile	Ser	Asn	Ala	Ser	Thr	Val	Ile	Gly
				325					330					335
Ala	Pro	Glu	Trp	Ile	Thr	Arg	Gln	Thr	Val	Ile	Glu	His	Gly	Leu
			340					345					350	
Asp	Ser	Gln	Phe	Lys	Leu	Thr	Glu	Met	Val	Gln	Trp	Ala	Tyr	Asp
	355						360				365			Asn
Asp	Ile	Cys	Glu	Glu	Ser	Glu	Ile	Ala	Phe	Glu	Tyr	Ala	Gln	Arg
	370					375					380			Gly
Asp	Phe	Asp	Ser	Asn	Ala	Arg	Ala	Phe	Leu	Asn	Ser	Asn	Met	Gln
385					390					395				400
Lys	Tyr	Val	Lys	Asp	Cys	Ala	Thr	Met	Cys	Arg	His	Tyr	Lys	His
			405						410					415
Glu	Met	Arg	Lys	Met	Ser	Ile	Lys	Gln	Trp	Ile	Lys	His	Arg	Gly
	420							425					430	Ser
Lys	Ile	Glu	Gly	Thr	Gly	Asn	Trp	Lys	Pro	Ile	Val	Gln	Phe	Leu
	435					440						445		Arg
His	Gln	Asn	Ile	Glu	Phe	Ile	Pro	Phe	Leu	Thr	Lys	Phe	Lys	Leu
	450					455					460			Trp
Leu	His	Gly	Thr	Pro	Lys	Lys	Asn	Cys	Ile	Ala	Ile	Val	Gly	Pro
465					470					475				480
Asp	Thr	Asp	Lys	Ser	Tyr	Phe	Cys	Met	Ser	Leu	Ile	Ser	Phe	Leu
			485					490						495
Gly	Thr	Val	Ile	Ser	His	Val	Asn	Ser	Ser	Ser	His	Phe	Trp	Leu
			500					505					510	Gln
Pro	Leu	Val	Asp	Ala	Lys	Val	Ala	Leu	Leu	Asp	Asp	Ala	Thr	Gln
	515						520					525		Pro
Cys	Trp	Ile	Tyr	Met	Asp	Thr	Tyr	Met	Arg	Asn	Leu	Leu	Asp	Gly
	530					535				540				Asn
Pro	Met	Ser	Ile	Asp	Arg	Lys	His	Lys	Ala	Leu	Thr	Leu	Ile	Lys
545					550				555					560
Pro	Pro	Leu	Leu	Val	Thr	Ser	Asn	Ile	Asp	Ile	Thr	Lys	Glu	Asp
			565						570					575
Tyr	Lys	Tyr	Leu	His	Thr	Arg	Val	Thr	Thr	Phe	Thr	Phe	Pro	Asn
			580					585					590	Pro
Phe	Pro	Phe	Asp	Arg	Asn	Gly	Asn	Ala	Val	Tyr	Glu	Leu	Ser	Asn
	595					600					605			Thr
Asn	Trp	Lys	Cys	Phe	Phe	Glu	Arg	Leu	Ser	Ser	Ser	Leu	Asp	Ile
	610					615					620			Gln
Asp	Ser	Glu	Asp	Glu	Glu	Asp	Gly	Ser	Asn	Ser	Gln	Ala	Phe	Arg
625				630					635					640
Val	Pro	Gly	Thr	Val	Val	Arg	Thr	Leu						
				645										

<210> 15  
 <211> 1107  
 <212> DNA  
 <213> HPV

<400> 15  
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 gtgctcctgt acaaggccaa gcagatgggg ctgtcccaca tcgggatgca ggctcgtgcc 180  
 ccgctgaagg tgagcgaagc caagggccac aacgctatcg agatgcagat gcacctggag 240  
 agcctgctgc ggaccgaata cagcatggag ccctggactc tccaggagac gtcctacgaa 300  
 atgtggcaga ctctccgaa gcgctgtttc gcaaagcgcg gcaagacagt tgaggtgaaa 360  
 ttcgatgggt gcgcaaaca cagcatggac tacgtggtgt ggaccgatgt ctacgtgcag 420  
 gacaatgaca cctgggtgaa ggtacatagt atggtggatg ccaaggcat ctattacacc 480

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acgctcgtca gcagcagcac caaggaggac gccgtccaga cgcacccccg gaagagggcc 720
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<210> 16  
 <211> 368  
 <212> PRT  
 <213> HPV

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<400> 16
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Glu Leu Tyr Glu Glu Asn Ser Thr Asp Leu His Lys His Val Leu His
20     25     30
Trp Lys Cys Met Arg His Glu Ser Val Leu Leu Tyr Lys Ala Lys Gln
35     40     45
Met Gly Leu Ser His Ile Gly Met Gln Val Val Pro Pro Leu Lys Val
50     55     60
Ser Glu Ala Lys Gly His Asn Ala Ile Glu Met Gln Met His Leu Glu
65     70     75     80
Ser Leu Leu Arg Thr Glu Tyr Ser Met Glu Pro Trp Thr Leu Gln Glu
85     90     95
Thr Ser Tyr Glu Met Trp Gln Thr Pro Pro Lys Arg Cys Phe Ala Lys
100    105    110
Arg Gly Lys Thr Val Glu Val Lys Phe Asp Gly Cys Ala Asn Asn Thr
115    120    125
Met Asp Tyr Val Val Trp Thr Asp Val Tyr Val Gln Asp Asn Asp Thr
130    135    140
Trp Val Lys Val His Ser Met Val Asp Ala Lys Gly Ile Tyr Tyr Thr
145    150    155    160
Cys Gly Gln Phe Lys Thr Tyr Tyr Val Asn Phe Val Lys Glu Ala Glu
165    170    175
Lys Tyr Gly Ser Thr Lys His Trp Glu Val Cys Tyr Gly Ser Thr Val
180    185    190
Ile Cys Ser Pro Ala Ser Val Ser Ser Thr Thr Gln Glu Val Ser Ile
195    200    205
Pro Glu Ser Thr Thr Tyr Thr Pro Ala Gln Thr Ser Thr Leu Val Ser
210    215    220
Ser Ser Thr Lys Glu Asp Ala Val Gln Thr Pro Pro Arg Lys Arg Ala
225    230    235    240
Arg Gly Val Gln Gln Ser Pro Cys Asn Ala Leu Cys Val Ala His Ile
245    250    255
Gly Pro Val Asp Ser Gly Asn His Asn Leu Ile Thr Asn Asn His Asp
260    265    270
Gln His Gln Arg Arg Asn Asn Ser Asn Ser Ser Ala Thr Pro Ile Val
275    280    285
Gln Phe Gln Gly Glu Ser Asn Cys Leu Lys Cys Phe Arg Tyr Arg Leu
290    295    300
Asn Asp Arg His Arg His Leu Phe Asp Leu Ile Ser Ser Thr Trp His
305    310    315    320
Trp Ala Ser Ser Lys Ala Pro His Lys His Ala Ile Val Thr Val Thr

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			325							330					335
Tyr	Asp	Ser	Glu	Gln	Arg	Gln	Gln	Phe	Leu	Asp	Val	Val	Lys	Ile	
			340							345			350		
Pro	Pro	Thr	Ile	Ser	His	Lys	Leu	Gly	Phe	Met	Ser	Leu	His	Leu	Leu
			355				360					365			

<210> 17  
 <211> 4154  
 <212> DNA  
 <213> HPV

<400> 17

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<210> 18  
 <211> 1384  
 <212> PRT  
 <213> HPV

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 20          25          30
Ser Asp Asp Glu Asp Glu Glu Val Glu Asp Ser Gly Tyr Asp Met Val
 35          40          45
Asp Phe Ile Asp Asp Ser Asn Ile Thr His Asn Ser Leu Glu Ala Gln
 50          55          60
Ala Leu Phe Asn Arg Gln Glu Ala Asp Thr His Tyr Ala Thr Val Gln
 65          70          75          80
Asp Leu Gly Gly Lys Tyr Leu Gly Ser Pro Tyr Val Ser Pro Ile Asn

          85          90          95
Thr Ile Ala Glu Ala Val Glu Ser Glu Ile Ser Pro Arg Leu Asp Ala
 100          105          110
Ile Lys Leu Thr Arg Gln Pro Lys Lys Val Lys Arg Arg Leu Phe Gln
 115          120          125
Thr Arg Glu Leu Thr Asp Ser Gly Tyr Gly Tyr Ser Glu Val Glu Ala
 130          135          140
Gly Thr Gly Thr Gln Val Glu Lys His Gly Val Pro Glu Asn Gly Gly
 145          150          155          160
Asp Gly Gln Glu Lys Asp Thr Gly Arg Asp Ile Glu Gly Glu Glu His
          165          170          175
Thr Glu Ala Glu Ala Pro Thr Asn Ser Val Arg Glu His Ala Gly Thr
 180          185          190
Ala Gly Ile Leu Glu Leu Leu Lys Cys Lys Asp Leu Arg Ala Ala Leu
 195          200          205

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Leu 210	Gly	Lys	Phe	Lys	Glu	Cys	Phe	Gly	Leu	Ser	Phe	Ile	Asp	Leu	Ile
Arg 225	Pro	Phe	Lys	Ser	Asp	Lys	Thr	Thr	Cys	Leu	Asp	Trp	Val	Val	Ala
Gly	Phe	Gly	Ile	His 245	His	Ser	Ile	Ser	Glu 250	Ala	Phe	Gln	Lys	Leu 255	Ile
Glu	Pro	Leu	Ser	Leu	Tyr	Ala	His	Ile	Gln	Trp	Leu	Thr	Asn	Ala	Trp
Gly	Met	Val	Leu	Leu	Val	Leu	Leu	Arg	Phe	Lys	Val	Asn	Lys	Ser	Arg
Ser	Thr	Val	Ala	Arg	Thr	Leu	Ala	Thr	Leu	Leu	Asn	Ile	Pro	Glu	Asn
Gln 305	Met	Leu	Ile	Glu	Pro	Pro	Lys	Ile	Gln	Ser	Gly	Val	Ala	Ala	Leu
Tyr	Trp	Phe	Arg	Thr 325	Gly	Ile	Ser	Asn	Ala	Ser	Thr	Val	Ile	Gly 335	Glu
Ala	Pro	Glu	Trp 340	Ile	Thr	Arg	Gln	Thr 345	Val	Ile	Glu	His	Gly 350	Leu	Ala
Asp	Ser	Gln	Phe	Lys	Leu	Thr	Glu	Met	Val	Gln	Trp	Ala	Tyr	Asp	Asn
Asp	Ile	Cys	Glu	Glu	Ser	Glu	Ile	Ala	Phe	Glu	Tyr	Ala	Gln	Arg	Gly
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<211> 4155



<212> DNA

<213> HPV

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<211> 1384

<212> PRT

<213> HPV

<400> 22

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Ile Cys Ser Pro Ala Ser Val Ser Ser Thr Thr Gln Glu Val Ser Ile
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His	Gly	Thr	Pro	Lys	Lys	Asn	Cys	Ile	Ala	Ile	Val	Gly	Pro	Pro	Asp
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	1285	1290
Pro Leu Leu Val Thr Ser Asn Ile Asp Ile Thr Lys Glu Asp Lys Tyr		1295
	1300	1305
Lys Tyr Leu His Thr Arg Val Thr Thr Phe Thr Phe Pro Asn Pro Phe		1310
	1315	1320
Pro Phe Asp Arg Asn Gly Asn Ala Val Tyr Glu Leu Ser Asn Thr Asn		1325
	1330	1335
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